



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,389	03/31/2004	Tadashi Yamamoto	A8701	5820
23373	7590	03/06/2007	EXAMINER	
SUGHRUE MION, PLLC			EVANS, GEOFFREY S	
2100 PENNSYLVANIA AVENUE, N.W.				
SUITE 800			ART UNIT	PAPER NUMBER
WASHINGTON, DC 20037			1725	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE		DELIVERY MODE
3 MONTHS		03/06/2007		PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/813,389	YAMAMOTO ET AL.
	Examiner Geoffrey S. Evans	Art Unit 1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 11 December 2006.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-84 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-84 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
     Paper No(s)/Mail Date \_\_\_\_\_
- 4) Interview Summary (PTO-413)  
     Paper No(s)/Mail Date. \_\_\_\_\_  
 5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_

## DETAILED ACTION

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1,2,4,5,7,9-12,14,15,17,19,20-27,29-34,48-50,52-56,66-74, and 84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et al. in U.S. Patent Application Publication No. 2006/0131288 in view of Boyle et al. in EP 1,260,838. Sun et al. discloses material processing using a burst of ultrashort laser pulses to ablate a sublayer (see paragraph 58) of the workpiece and selecting appropriate pulse parameters (energy, pulse width, and wavelengths). Boyle et al. teaches (as shown in figure 2) a first pulse having a width greater than the pulse width of a second laser pulse, the second laser pulse being in the picosecond range or shorter. It would have been obvious to adapt Sun et al. in view of Boyle et al. to provide this, the motivation being to avoid cracks and strains in the workpiece.

3. Claims 3 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et al. in view of Boyle et al. as applied to claim 1 above, and further in view of Jennings in U.S. Patent Application Publication No. 2003/0196995 A. Jennings teaches measuring pulse width at half maximum (see paragraph 36). It would have been obvious to adapt Sun et al. in view of Boyle et al. and Jennings to provide this to measure the pulse widths by a known standard.

Art Unit: 1725

4. Claims 6,16,24-28,51, and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et al. in U.S. Patent Application Publication No. 2006/0131288 A1 in view of Boyle et al. as applied to claims 1,12,48, and 66 above, and further in view of Sasaki et al. in U.S. Patent Application Publication No. 2003/0216012 A1. Sasaki et al. teaches using pulses of different vectors of polarization (see paragraph 136). It would have been obvious to adapt Sun et al. in view of Boyle et al. and Sasaki to provide this so that more energy is absorbed by the material.

5. Claims 8,18,23,53,67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et al. (288) in view of Boyle et al. as applied to claims 1,12,22,48, and 66 above, and further in view of Yamazaki et al. in U.S. Patent Application Publication No. 2004/0214411. Yamazaki et al. teach laser processing with a pulse frequency greater than 100 kHz (see paragraph 122). It would have been obvious to adapt Sun et al. in view of Yamazaki et al. to provide this to efficiently laser process the material.

6. Claims 35,36,39,40,41,43-47,57-59,63-65,75,78,79-83, and 84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et al. in view of Boyle et al. in EP 1,260,838 and Forsman et al. in U.S. Patent No. 6,664,498. Sun et al. discloses material processing using a burst of ultrashort laser pulses to ablate a sublayer (see paragraph 58) of the workpiece and selecting appropriate pulse parameters (energy, pulse width, and wavelengths). Boyle et al. teaches using ultrashort pulses in which the second pulse has a shorter pulse width than the pulse width of the first laser pulse in to prevent cracks and strains in the workpiece. Forsman et al. teach using overlapping pulses (see figure 2B). It would have been obvious to adapt Sun et al. in view of Boyle

et al. and Forsman et al. to provide this to being to avoid cracks and strains in the workpiece and to enhance the machining removal rate.

7. Claims 37,62 and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et al. in U.S. Patent Application Publication No. 2006/0131288 in view of Boyle et al. in EP 1,260,838 and Forsman et al. in U.S. Patent No. 6,664,498 as applied to claims 35,57 and 75 above, and further in view of Yamazaki et al. in U.S. Patent Application Publication No. 2004/0214411. Yamazaki et al. teach processing with a pulse frequency greater than 100 kHz (see paragraph 122). It would have been obvious to adapt Sun et al. in view of Forsman et al and Yamazaki et al. to provide to efficiently laser process the material.

8. Claims 38,42,60, and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun et al. in U.S. Patent Application Publication No. 2006/0131288 A1 in view of Boyle et al. and Forsman et al. in U.S. Patent No. 6,664,498 as applied to claims above, and further in view of Sasaki et al. in U.S. Patent Application Publication No. 2003/0216012 A1. Sasaki et al. teaches using pulses of different vectors of polarization (see paragraph 136). It would have been obvious to adapt Sun et al. in view of Boyle et al., Forsman et al. and Sasaki et al. to provide this so that more energy is absorbed by the material.

9. Applicant's arguments with respect to claims of record have been considered but are moot in view of the new ground(s) of rejection. The newly cited Boyle et al. reference discloses having the second pulse width being shorter than the fist pulse width and thus corrects the problems with the Sun et al. reference discussed in the

Art Unit: 1725

REMARKS of 11 December 2006. In claim 22 the language "wherein predetermined parameters of the first pulse are selected to induce a change in a selected property of the material, and predetermined parameters of the second pulse are selected based upon the property change induced by the first pulse" is considered to be done by the user prior to laser machining. Boyle et al. discloses the second pulse entering the modification caused by the first laser pulse, the duration and energy set as a function of the material.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey S. Evans whose telephone number is (571)-272-1174. The examiner can normally be reached on Mon-Fri 6:30AM to 4:00 PM, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571)-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO

Application/Control Number: 10/813,389  
Art Unit: 1725

Page 6

Customer Service Representative or access to the automated information system, call  
800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Geoffrey S Evans  
Primary Examiner  
Art Unit 1725

GSE